

**PROCESS FOR PRODUCTION OF ACETYL ANHYDRIDES AND  
OPTIONALLY ACETIC ACID FROM METHANE AND CARBON  
DIOXIDE**

**ABSTRACT OF THE DISCLOSURE**

Acetyl anhydrides such as acetyl sulfate are produced by a process for comprising contacting methane and carbon dioxide in an anhydrous environment in the presence of effective amounts of a transition metal catalyst and a reaction promoter, and an acid anhydride compound, and optionally an acid. The acetyl anhydride can be contacted with water to produce acetic acid or with an alcohol to produce a product comprising an acetate ester and that may also comprise acetic acid.

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